



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/537,907

06/06/2005

Keiichi Nomura

03500.017898.

9216

5514

7590

06/26/2008

FITZPATRICK CELLA HARPER & SCINTO
30 ROCKEFELLER PLAZA
NEW YORK, NY 10112

EXAMINER

HENN, TIMOTHY J

ART UNIT

PAPER NUMBER

2622

MAIL DATE

DELIVERY MODE

06/26/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/537,907	Applicant(s) NOMURA ET AL.	
	Examiner Timothy J. Henn	Art Unit 2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 10, 11 and 13-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 June 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Information Disclosure Statement

2. The information disclosure statement filed 21 November 2006 fails to comply with 37 CFR 1.98(a)(3) because it does not include a concise explanation of the relevance, as it is presently understood by the individual designated in 37 CFR 1.56(c) most knowledgeable about the content of the information, of each patent listed that is not in the English language. It has been placed in the application file, but the information referred to therein has not been considered. The Official Letter/Search Report letter is not in the English language and therefore has not been considered.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-8, 10, 11, 13-18 rejected under 35 U.S.C. 103(a) as being unpatentable over Miyake (US 5,552,630) in view of in view of Uppal et al. (US 6,501,065).

[claim 1]

Regarding claim 1, Miyake discloses a solid-state image pickup device comprising a plurality of photoelectric conversion elements (Figures 1 and 2) and a plurality of switching elements (Figures 1 and 2), the switching elements including a shielding electrode layer (Figure 2, Items 9). However, Miyake does not disclose placing the photoelectric conversion portion above the switching elements.

Uppal discloses an image sensor wherein the photodiode is placed above CMOS circuitry in order to reduce manufacturing costs and reduce chip size for a given array (c. 7, 16-23). Therefore, it would be obvious to place the switching elements of Miyake below the photoelectric conversion elements to reduce manufacturing costs and chip size.

[claim 2]

Regarding claim 2, Miyake discloses one or more switching elements disposed in one pixel (Figure 2).

[claim 3]

Regarding claim 3, Miyake discloses a photoelectric conversion element, but does not explicitly disclose its structure. Uppal shows a similar photoelectric conversion portion and describes the use of a pin photodiodes above an insulator layer (Figure 2; c. 6, ll. 11-25). Therefore, it would be obvious to use a pin photoelectric conversion portion as taught by Uppal since pin photodiodes are well understood in the prior art.

[claim 4]

Regarding claim 4, see claim 3 above and note that pin diodes include semiconductor layer and two high impurity layers of opposite conductivity type.

[claim 5]

Regarding claim 5, Miyake discloses a shielding electrode layer which is not formed above a signal line connected to a source electrode (Figure 2).

[claim 6]

Regarding claim 6, Miyake discloses holding the shielding electrode at a constant electric potential (c. 5, ll. 39-41).

[claim 7]

Regarding claim 7, Miyake discloses grounding the shielding electrode (c. 5, ll. 39-41).

[claim 8]

Regarding claim 8, Miyake discloses switching elements which are TFTs and a shielding electrode which covers an upper portion of a channel of TFTs (Figure 2).

[claims 10 and 11]

Regarding claims 10 and 11, Miyake discloses a shielding electrode made of Al (c. 5, ll. 6-7). Official Notice is taken that materials such as Mo, Cr, Ti, W and MoW are well known in the art as metals which may be used in place of Al to form structures in semiconductor devices. Therefore, it would be obvious to use metals such as Mo, Cr, Ti, W and MoW in place of Al to form the shielding electrode since these metals are well known alternatives to Al in semiconductor devices. The examiner notes that metals

such as Mo, Cr, Ti, W and MoW are high melting point metals.

[claim 13]

Regarding claim 13, Miyake in view of Uppal discloses a solid-state pickup device including a gate electrode layer (Miyake, Figure 2, Item 2), a gate insulating layer (Miyake, Figure 2, Item 1), a first amorphous semiconductor layer (Uppal, Figure 6, Item 21, 1st photodiode), a first n type semiconductor layer (Uppal, Figure 6, Item 20, 1st photodiode), a source/drain electrode layer (Miyake, Figure 2, Items 7 or 8), a first interlayer insulating layer (Figure 2, Item 15), the shielding electrode layer (Miyake, Figure 2, Item 9), a second interlayer insulating layer (Miyake, Figure 2, insulating layer between items 5 and 9), a sensor lower electrode layer (Uppal, Figure 6, Item 14), an insulating layer (Miyake, Figure 2, Item 5), a second amorphous semiconductor layer (Uppal, Figure 6, Item 21, 2nd photodiode), a second n type semiconductor layer (Uppal, Figure 6, Item 20, 2nd photodiode), a transparent electrode layer (Uppal, Figure 6, Item 27) and a sensor biasing electrode layer (Uppal, Figure 6, Item 22).

[claim 14]

Regarding claim 14, Miyake in view of Uppal discloses one photodiode conversion element and one or more TFTs disposed in one pixel (Miyake, Figure 2).

[claim 15]

Regarding claim 15, Miyake in view of Uppal discloses an image pickup device as claimed in claims 1 and 2, but does not disclose a wavelength conversion unit. Official Notice is taken that the use of wavelength conversion devices placed in front of image pickup devices are well known in the art to allow image capture of radiation

Art Unit: 2622

beyond the range of normal response of the image pickup device. Therefore, it would be obvious to use a wavelength conversion device with the image pickup device of Miyake in view of Uppal to change the range of response to radiation.

[claim 16]

Regarding claim 16, see claim 2.

5. Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda et al. (US 6,403,965) in view of Miyake (US 5,552,630).

[claim 17]

Regarding claim 17, Ikeda discloses a radiation image pickup device comprising a radiation conversion layer for directly converting radiation into electric charges and a plurality of switching elements, characterized in that the radiation conversion layer is formed above one or more switching elements (Figures 1 and 2). Ikeda further discloses TFTs, but does not disclose a shielding electrode layer as claimed.

Miyake discloses placing shielding electrode layers over a TFT to prevent interference caused by voltage variations (c. 5, ll. 31-41). Therefore, it would be obvious to include shielding electrode layers as claimed and taught by Miyake to prevent interference between the switching elements.

[claim 18]

Regarding claim 18, Ikeda discloses an image pickup device including a gate electrode layer (Figure 2, Item 202); a gate insulating layer (Figure 2, Item 201); a first amorphous semiconductor layer (Figure 2, Item 210); a first n type semiconductor layer

(Figure 2, Item 211); a source/drain electrode layer (Figure 2, Electrodes of switching elements); a first interlayer insulating layer (Figure 2, Item 207a), the shielding electrode layer (Miyake, Figure 2); a second interlayer insulating layer (Figure 2, Item 207b); a sensor lower electrode layer (Figure 2, Item 203); a radiation conversion layer (Figure 2, Item 209); and a sensor biasing electrode layer (Figure 2, Item 212).

Allowable Subject Matter

6. Claims 9 and 12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

[claims 9 and 12]

While Miyake discloses the use of a shielding electrode layer, the prior art does not teach or fairly suggest a shielding electrode layer which meets the requirements for width and thickness in a solid-state imaging device as claimed.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy J. Henn whose telephone number is (571)272-7310. The examiner can normally be reached on M-F 11-7.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lin Ye can be reached on (571) 272-7372. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Timothy J Henn/
Primary Examiner, Art Unit 2622